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WHAT IS CLAIMED IS:

- 5  1. A method of sterilizing a material comprising:  
applying said material with a bioactive coating comprising  
polymerizable chemical;  
polymerizing said bioactive coating on said material; and  
sterilizing said material and said bioactive coating with a sterilization  
process comprising hydrogen peroxide employing gas plasma.
- 10 2. The method of claim 1, wherein at least a portion of the polymerizing  
step and the sterilizing step occur simultaneously.
3. The method of claim 1 further comprising grafting said bioactive coating  
on said material.
4. The method of claim 3, wherein at least a portion of the polymerizing  
step, grafting step, and the sterilizing step occur simultaneously.
- 15 5. The method of claim 1, wherein the material comprises metal, non-metal,  
polymer or plastic, elastomer, or biologically derived material.
6. The method of claim 1, wherein the material is selected from the group  
consisting of stainless steel, aluminum, nitinol, cobalt chrome, and titanium.
7. The method of claim 1, wherein the material is selected from the group  
consisting of glass, silica, and ceramic.
- 20 8. The method of claim 1, wherein the material is selected from the group  
consisting of polyacetal, polyurethane, polyester, polytetrafluoroethylene, polyethylene,  
polymethylmethacrylate, polyhydroxyethyl methacrylate, polyvinyl alcohol,  
polypropylene, polymethylpentene, polyetherketone, polyphenylene oxide, polyvinyl  
chloride, polycarbonate, polysulfone, acrylonitrile-butadiene-styrene, polyetherimide,  
25 polyvinylidene fluoride, and copolymers and combinations thereof.
9. The method of claim 1, wherein the material is selected from the group  
consisting of polysiloxane, fluorinated polysiloxane, ethylene-propylene rubber,  
fluoroelastomer and combinations thereof.
- 30 10. The method of claim 1, wherein the material is selected from the group  
consisting of polylactic acid, polyglycolic acid, polycaprolactone, polyparadioxanone,

polytrimethylene carbonate and their copolymers, collagen, elastin, chitin, coral, hyaluronic acid, bone and combinations thereof.

11. The method of claim 1, wherein the bioactive coating is selected from the group consisting of biocompatible coating, infection resistance coating, antimicrobial coating, drug release coating, antithrombogenic coating and lubricious coating.

12. The method of claim 1, wherein the bioactive coating comprises heparin, phosphoryl choline, urokinase or rapamycin.

13. The method of claim 1, wherein the bioactive coating comprises a hydrophilic or hydrophobic coating.

14. The method of claim 1, wherein the bioactive coating ~~is~~ <sup>comprises a polymer</sup> selected from the group consisting of polyvinyl pyrrolidone, polyethylene glycol, polypropylene glycol, polyethylene glycol-co-propylene glycol, polyethylene glycol acrylate, polyethylene glycol diacrylate, polyethylene glycol methacrylate, polyethylene glycol dimethacrylate, polyethylene oxide, polyvinyl alcohol, polyvinyl alcohol-co-vinylacetate, polyhydroxyethyl methacrylate, and polyhyaluronic acid, and hydrophilically substituted derivatives, monomers, unsaturated pre-polymers, and uncrosslinked polymers with double bonds thereof.

15. The method of claim 1, wherein the bioactive coating ~~is~~ <sup>comprises a polymer</sup> selected from the group consisting of polytetrafluoroethylene, polyethylene, polypropylene, poly(ethylene terephthalate), polyester, polyamides, polyarylates, polycarbonate, polystyrene, polysulfone, polyethers, polyacrylates, polymethacrylates, poly(2-hydroxyethyl methacrylate), polyurethanes, poly(siloxane)s, silicones, poly(vinyl chloride), fluorinated elastomers, synthetic rubbers, poly(phenylene oxide), polyetherketones, acrylonitrile-butadiene-styrene rubbers, polyetherimides, and hydrophobically substituted derivatives thereof and their precursor monomers.

16. A method of sterilizing and polymerizing a bioactive coating on a material comprising:

applying said material with a bioactive coating comprising non-polymerized but polymerizable chemical; and

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simultaneously polymerizing said bioactive coating and sterilizing said material and bioactive coating with a sterilization process comprising hydrogen peroxide employing gas plasma.

5 17. The method of claim 16 further comprising grafting said bioactive coating on said material.

18. The method of claim 17, wherein at least a portion of the polymerizing step, grafting step, and the sterilizing step occur simultaneously.

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